

METHOD OF AND APPARATUS FOR  
EXPANDING FUNCTIONALITY OF VEHICLE CASSETTE TAPE-PLAYER  
DECKS TO PERMIT DICTATION OR OTHER RECORDING  
AND AUTOMATIC REMOTE STATION RELAYING OF SAME

INS A17

The present invention relates to vehicle tape decks and the like (the terms "tape", "tape deck" and "cassette" being generically used herein to embrace not only cartridges of magnetic storage strips or tapes but discs and other well-known recording media, as well), being more particularly directed to the expansion of the functionality of the same beyond the mere playing or reproducing of pre-recorded material to permit, also, dictation or other message recording by the vehicle operator (or passengers) and, where desired, automatic remote station relaying of the same from the vehicle (and also the vehicle AM/FM radio broadcast reception, if desired), as by cellular radio telephone.

## Background

While audio mono, multi-channel and stereo tape recorders (analog and digital) with recording and playback functions have been employed for decades in many settings, including fixed and portable versions, the conventional tape

**COLE**

4

A

A ✓

An object of the invention, accordingly, is to provide a new and improved method of and apparatus for expanding the functionality of current-day vehicle tape deck systems to permit safe and minimal operator-attention operator dictation or other message functions, as well; and with the further feature, where desired, of enabling automatic

B

real-time relaying of the same, as over cellular radio telephone, to remote stations and/or for subsequent playback and automatic transmission to remote stations at desired times.

A further object is to enable, where desired, recording of the vehicle AM/FM radio broadcast reception and its transmission, where appropriate, to remote stations via the cellular radio telephone system.

Other and further objects are explained hereinafter and are more particularly delineated in the appended claims.

#### Summary

In summary, however, from one of its important aspects, the invention embraces, for integration with a vehicle passive audio-tape cassette deck playback system having power, play, rewind and forward controls operable, in a play mode, to reproduce signals stored on a pre-recorded tape in audio form in a vehicle loudspeaker by scanning the tape forwardly <sup>by</sup> past a playback head connected to playback amplifiers driving the loudspeaker, apparatus for rendering the system capable of active dictation recording use on a tape and simultaneous transmission to a remote location, or later transmission upon rewind and playing of the recorded

tape, via a cellular radio telephone transmitter system also carried by the vehicle, said apparatus having, in combination, auxiliary apparatus comprising a microphone, audio amplifying means and a recording head cooperative with the tape for enabling the driver, upon actuation of a recording dictation mode, to dictate in the vehicle into the microphone and record such on the tape; programmable control means cooperative with the said auxiliary apparatus and with the modulator of said cellular radio telephone transmitter system for switching said audio amplifying means, upon said actuation of the recording dictation mode, to energize said recording head to record the dictation on said tape and, after operation of said rewind control, to playback the same as recorded on the tape through one or both of two paths: one, through said playback amplifiers for driver listening through said vehicle loudspeaker, and secondly, for directly modulating the cellular radio transmitter modulator to transmit to a remote location; said programmable control means further having means, operable upon actuation of said recording dictation mode, for connecting said audio-amplifying means to said modulator, to transmit the dictation via the cellular radio telephone transmitter in real time during said dictation, selectively with or without

## Drawings

Fig. 2 is a flow diagram of the operation; and

### Description

A ✓

A ✓

communication with a remote station RS totally independently of the vehicle playback deck and AM/FM radio receiver. A typical car cellular radio is the Alpine Model 9511 Transceiver of Alpine Electronics of America, Inc.

In accordance with the present invention, as before stated, not only is the playback deck 1 extended in functionality to permit operator and/or passenger recording of dictation (thoughts, appointments, names, instructions, observations, reports, letters, tasks, or other messages, data or materials), but to enable automatic combination with the now totally separately functioning cellular radio telephone system C to permit transmission of the same to a remote location(s), either in real time or by subsequent playback of recording of the same at the vehicle tape deck. Such, as previously stated, can also be extended to the "messages" in the form of the received programs on the vehicle AM/FM radio receiver.

Thus, in Fig. 1, there is shown added to the playback "tape" deck 1 auxiliary apparatus, also interconnected with the cellular telephone C, which may now be physically located (or at least dictation or other message controls for transmission thereover) as part of or in close proximity to those of the radio-tape deck unit. Such auxiliary apparatus



1. The first group of people who are interested in the results of the study are the researchers themselves. They want to know how well the study was conducted and whether the results are reliable. This is important for them to be able to use the results in their own work.

1. The first group of people who are interested in the results of the study are the researchers themselves. They want to know how well the study was conducted and whether the results are reliable. This is important for them to be able to use the results in their own work.

Referring to the switching sequence and operation and program flow chart of Fig. 2, and considering first the added functionality of the operator dictation and local recording when driving (Option O<sub>1</sub> in Fig. 2), in fashion

similar to the operator's current-day pressing of the play mode (PL) of the tape deck 1, the operator may depress PL and the added record button REC together (Step I in Fig. 2), as in the conventional fashion in tape recorders (illustrated by dotted line gang connection) to initiate the added dictation function. The circuitry for effecting this by rendering operational the microphone MIC-recording amplifiers RA-recording head RH-and tape motor drive M, may, for example, be identical to that of well-known conventional tape recorders, including the type of circuits of the Minisette-15 and 20 cassette recorders described in respective catalogs 14-1027 and 14-1055A of Tandy Corporation, 1985 and 1988, respectively, or other well known recorder systems of this character. This will cause the recording amplifiers RA, Fig. 1, to energize the recording head RH via switch S, and record the dictation (or other "message") on a blank tape D, as shown by Steps II, III and IV in Fig. 2, so-labelled. Particularly for minimal driver concern, a voice or sound-activated on-off switch 9 is preferably employed (as, for example, of the said Minisettes 15 and 20 recorders) to activate recording only when dictation commences and during voice activity.

Following recording, with the same minimal diversion

from driving attention as in current radio and tape deck operation in cars, particularly in view of the incorporation of controls in the single deck region, should the operator desire playback of the recording (Option O<sub>2</sub> in Fig. 2), conventional rewind step V and playback step VI are effected (REW and PL controls in Fig. 1), enabling listening to the recording at the local vehicle loudspeaker(s) L, Figs. 1 and 2.

As before discussed, should the operator desire the dictation or other message to be transmitted automatically to a remote station to which the cellular radio telephone is dialed in conventional fashion, including by special code button, this may, in accordance with the features of the invention, be achieved <sup>first</sup> ~~either~~ in real time (with or without recording at the vehicle tape deck), <sup>It may</sup> ~~or~~ be done later either when a certain number of dictated inputs have been effected or after a certain desired monitored time has elapsed, by rewind and playback of the recorded tape with automatic modulation of the cellular telephone transmitter circuitry, *This is* as distinguished from modulation by voice spoken into the cellular telephone mouthpiece as in voice telephone communication, <sup>all effected</sup> all automatic without the driver being involved other than actuating the desired function button

SECRETED 927000

control.

Considering, first, Option  $O_3$  of Fig. 2, if it is desired to transmit the dictation in real time to a remote location on station RS while recording the same in the tape deck 1, as for transmitting information/data back to a person's office or secretary for follow-up, with a record kept on the vehicle tape, after ordering election of the before-discussed Option  $O_1$ , the added function control button REC-TX is actuated (as under control of MC) opening a CONNECT gate switch  $S-C_1$  to enable the microphone amplifier output (RA, Fig. 1) to apply modulation signals to the modulator of the cellular telephone transmitter circuit ( $M'$  in Figs. 1 and 2) and thus to transmit the dictation over the air to the remote station(s) RS, where it may be heard at  $L'$  and/or stored for later playback at A. In the schematic switch analogy format of Fig. 1, switch  $S-C_1$  closes in response to actuation of control button REC-TX (illustrated by dotted gang-line), connecting amplifier(s) RA by line 5 to the input of the modulator  $M'$ . This may be direct analog signal modulation (AM or FM), or sampling may be involved and digital format may be transmitted and reconverted to analog voice or other audio content of the dictated or recorded message at the receiver RS, as is

RECEIVED 9-2-66

well-known.

Selection of the "NO" path at Option  $O_1$  will avoid recording at the tape deck 1, as where it is desired to transmit the dictation automatically and directly to the remote station(s) via the cellular radio telephone system without recording on the vehicle tape deck (switch S open in Fig. 1).

In the event, however, it is not desired to transmit to the remote station at the time of dictation, namely Option  $O_4$  of Fig. 2, then before-mentioned Option  $O_2$  may be initiated at a desired time to effect previously described rewinding and then playback Steps V and VI, with a selection of Step VII of Option  $O_4$  (button PL-TX, Fig. 1) enabling "CONNECT" switching gate  $C_2$  to feed the output of the playback amplifier(s) directly to modulate the cellular telephone radio transmitter circuit at  $M'$ , as before explained. In the circuit of Fig. 1, this is shown effected by the dotted-line gang control of PL-TX closing switch  $S-C_2$  to feed the output of playback amplifiers PA to the modulation circuit  $M'$  via line 7.

The time selected for the playback transmission of the recorded dictation or other message via the cellular telephone radio line C to the remote station RS may be

arbitrary or automatic, including after a predetermined length of time has been monitored at Step VIII, Fig. 2, or a certain number of messages or inputs has been effected; or on demand.

With the microprocessor control MC and the integration of tape deck and cellular radio telephone systems, the above sets of functions may readily be pre-formatted or pre-programmed for the desired options or modes, thereby making it a simple on/off situation (schematically designated by "MC" setting or control) for the operator, readily changeable as different needs arise -- thus adding to the safety of the vehicle operation and minimum distraction.

As previously discussed, furthermore, the invention readily lends itself, also, to recording and/or remotely transmitting (via the cellular telephone system), where desired, the messages or programs received by the vehicle AM/FM radio receiver, generally currently proximally integrated into the playback deck front panel assembly. Thus, as shown by conventional Option O<sub>5</sub> in Fig. 2, the operator or passenger listens to the programs ("messages") by turning on and tuning in, so that the receiver output amplifiers R-RA drive the vehicle loudspeakers L

(schematically shown as by CONNECT  $C_3$ ) in normal fashion. Should it be desired (Option  $O_6$ ) to record the same with the system of the invention (R-REC, Fig. 1), Step IX, an appropriate part of the output of the receiver output amplifiers R-RA is fed via CONNECT gate  $C_4$  to the record amplifiers of the tape deck (Step IV, Fig. 2). If Option  $O_7$  is selected to transmit the received broadcast information to the remote station RS, then Step X is effected, connecting the receiver output amplifiers R-RA at  $C_5$  to the modulator circuit M' of the cellular radio telephone transmitter C.

The invention, through its extending of the functionality of the current playback deck, and with cellular telephone integration, thus provides for greatly increased and facile information communication and storage, most desirable for vehicle operators who wish to record and/or transmit, real time thoughts and observations without impairing vehicle operation -- inspectors of traffic, advertising, signs, buildings, road, etc.; writers, executives, doctors, lawyers, engineers, other professionals -- virtually everyone who wishes to capture thoughts or record or impart information, data and observations while driving.

The microphone MIC, in the system integration of the

As above observed, the invention is not limited to magnetic recording strips but is equally applicable with other types of recording media including laser and other



Further modifications will also occur to those skilled in this art and such are considered to fall within the spirit and scope of the invention as defined in the appended claims.